Pipeline

Summer 1996
Vol. 7, No. 3

NATIONAL SMALL FLOWS CLEARINGHOUSE

Small Community Wastewater Issues Explained to the Public

Wastewater Treatment Protects Small Community Life, Health

A lot of publicity has been given recently to a growing trend across the U.S. City dwellers are moving to small towns and rural communities in search of a better quality of life. Quiet green countryside. friendly neighborhoods, and pristine lakes, streams, and rivers-the ideals of rural living—are valued by longtime small community residents as well.

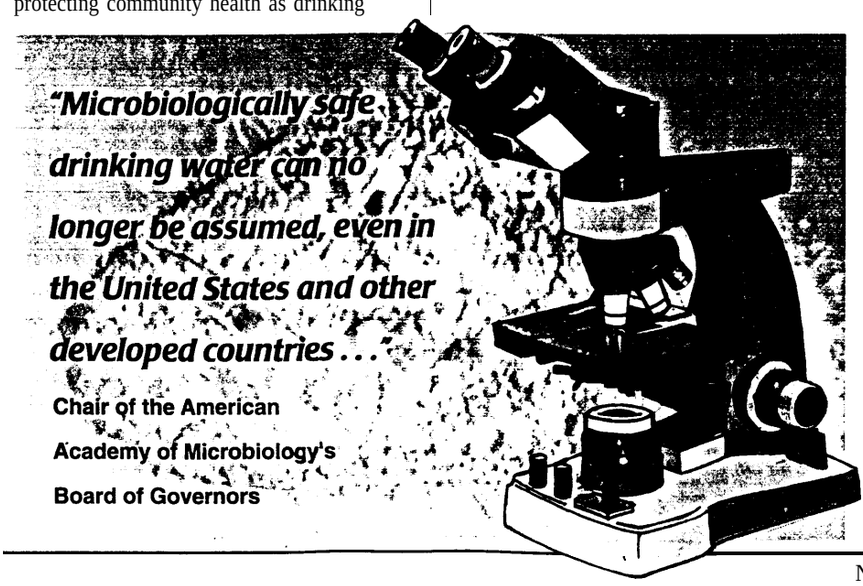
What often receives less attention are the challenges that many of these small communities face in maintaining their quality of life. For example, a surprising number of households in small and rural communities in the U.S. lack adequate facilities for the proper collection, treatment, and disposal of wastewater—all essential to protecting the environment and the health of the public. (See *the article, "Still Living Without the Basics, " on page 2.)*

In fact, ensuring proper wastew ater treatment and disposal is as important for protecting community health as drinking water treatment, garbage collection, and immunization programs. Untreated wastewater can spread disease and contaminate drinking water sources.

But most Americans give little thought to what happens to their wastewater, and the availability of safe, clean drinking water is often taken for granted. Cholera and other wastewater-related diseases are generally viewed as threats only for other, less developed countries.

Not so, according to a report released in May by the American Academy of Microbiology. Complacency about wastewater treatment can be dangerous.

The report, titled *A Global Decline in the Microbiological Safety of Water: A Call for Action, estimates* that, worldwide, 80 percent of infectious diseases maybe water related. Diarrhea] diseases traced to contaminated water kill approximately 2 million children and cause about 900 million episodes of illness each year.



"Microbiologically safe drinking water can no longer be assumed, even in the United States and other developed countries . . .

Chair of the American Academy of Microbiology's Board of Governors

In a public statement about the report, Rita Colwell, Ph. D., D.Sc., president of the University of Maryland Biotechnology Institute and chair of the academy's board of governors, warns, "Microbiologically safe drinking water can no longer be assumed, even in the United States and other developed countries, and the situation will worsen unless measures are taken in the immediate future-the crisis is global."

The report makes several conclusions and recommendations for improving global water quality, including the need to educate governments and the public about the risks of diseases caused by contaminated water.

Examples of recent large-scale outbreaks of the waterborne illness cryptosporidiosis in the United Kingdom, Canada. and Milwaukee, Wisconsin, help to illustrate the potential risk to developed countries. Cryptosporidiosis is caused by a microorganism found in water contaminated by human or animal feces. (See *the articles on wastewater-related diseases beginning on page 3.)*

The report describes the 1993 Milwaukee cryptosporidiosis outbreak as the largest recorded outbreak of waterborne disease in U.S. history, affecting approximately 400,000 people—about one-fourth of the city's population-and killing 104 people.

However, most outbreaks of waterborne illnesses in the U.S. can be traced to individual wells or small community systems. Drinking water contaminated by sewage is a principal cause.

This issue of *Pipeline* examines the importance of wastewater treatment for protecting the health and environment of small communities. Some of the potential

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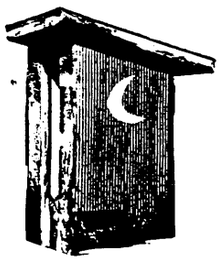
Why Every Community Needs Wastewater Treatment

Still Living Without the Basics



According to a report by the Rural Community Assistance Program (RCAP), a surprising number of rural households in the U.S. still lack the basics for ensuring sanitary conditions.

Using 1990 U.S. Census Bureau data, the report shows that almost one-third of all rural households, or 1.1 million rural Americans, live without one or more of the following in their homes: a flush toilet, bathtub or shower, sink, and a tap supplying hot and cold water that is safe to drink.

The report, titled *Still Living Without the Basics,* states that indoor plumbing is vital for the health and safety of rural people and "the lack of a safe water supply and wastewater facilities adversely affects a community's capacity for economic development and detracts from the overall quality of life."

The report also points out that, while households lacking complete plumbing are located in all parts of the country, it is primarily a rural problem. Rural elderly and children are among the groups most affected and are also more vulnerable to the health risks posed by living without indoor water or indoor wastewater facilities.

For more information about the report or to request a free copy, write to Dana Weber, RCAP, 602 South King St., Suite 402, Leesburg, VA 22075, or call (703) 771-8636.

Even if controlling gases and odors from sewage weren't reason enough, every community needs to treat its wastewater because of the serious health problems it can cause. Although this may seem obvious, untreated wastewater is still the root cause of much environmental darnage and human illness, misery, and death around the world.

Sometimes it is useful to reexamine basic ideas like why wastewater treatment is important, especially today when so many communities need to save money and reprioritize their needs and funding for public projects.

What is in wastewater?

Sources of wastewater from small communities include homes, farms, hospitals, and businesses. Some communities have combined sewers that collect both wastewater and storm water runoff from streets, lawns, farms, and other land areas. So wastewater can include any debris from streets and waste oils, pesticides, fertilizers, and wastes from humans and animals.

Wastewater from a typical household might include toilet wastes; used water from sinks, baths, showers, washing machines, and dishwashers; and anything else that can be put down the drain or flushed down the toilet.

What makes wastewater so dangerous?

Feces and urine from both humans and animals carry many disease-causing organisms. Wastewater also may contain harmful chemicals and heavy metals known to cause a variety of environmental and health problems.

Disease-causing organisms (pathogens) from humans can enter a community's wastewater from patients at hospitals, or from anyone who is sick or a carrier of " disease. Carriers may not have symptom or even know they have a disease.

Animal wastes often enter from farms, meat packing and processing facilities, and from rats and other animals found in or around sewage or sewers.

Much of our wastewater, treated or untreated, eventually ends up in our rivers, streams, lakes, and oceans—sometimes via groundwater, the underground water source we tap for well water. We often assume that groundwater is pure—and it usually is—but unfortunately, well water contaminated by sewage is a common cause of outbreaks of wastewater-related diseases.

When untreated wastewater reaches water used as a drinking water source for the community, there can be significant health risks. The effectiveness of drinking water treatment can be reduced when water is heavily contaminated with waste. To ensure safe drinking water, communities need both effective water and wastewater treatment.

In addition, communities need to make sure that untreated wastes are not disposed of improperly on land where people can come in direct contact with it or where it can attract disease-carrying insects or animals. *

Wastewater Treatment Protects Small Community Life Health

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health and environmental risks posed by inadequate treatment are also described.

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Pipeline *can also be ordered in bulk for distribution. To place an order, or to obtain further information about any of the topics in this newsletter, please contact the National Small Flows Clearinghouse at (800) 624-8301.*

Copies of the report from the American Academy of Microbiology can be obtained through written requests via fax, (202) 942-9380; e-mail, academy @asmusa.org; or to the Academy at 1325 Massachusetts Ave., NW, Washington, DC 20005.

How Are Diseases Spread from Wastewater?

Humans "catch" diseases from wastewater in a variety of ways. Pathogens in wastewater may be transmitted by direct contact with sewage, by eating food or drinking water contaminated with sewage, or through contact with human, animal, or insect carriers.

For example, direct contact might accidentally occur as a result of walking in fields fertilized with untreated wastes. playing or walking in a yard with a failed septic system, touching raw sewage disposed of in open areas, swimming or bathing in contaminated water, or working with or coming into contact with animals or wastewater and not following proper hygiene.

Houseflies can be used to illustrate the dangers posed by disease carriers. Flies, which have tastebuds on their feet, always land directly on the food they eat—and on any given day, that could mean raw sewage (a fly favorite) followed by picnic food. The hairs on a housefly's body can carry millions of pathogens, which then brush off on anything the fly touches.

By making sure that wastewater is treated and disposed of properly, communities can control the spread of disease by flies and other disease carriers, such as rats, lice, cockroaches, and mosquitoes.

By controlling the population of these animals and insects, communities also help to control the other, nonwastewater-related diseases they may carry.

But by far the most common way that people contract diseases from wastewater is through the fecal-oral route, or in other words, by eating food or drinking water contaminated by sewage or by not washing hands after contact with sewage.

In communities where wastewater treatment is inadequate or nonexistent, the opportunities for people to become infected seem endless. For example, people have become ill by doing the following:

- drinking contaminated water, juices made with water, or other beverages made with contaminated water or ice;
- eating food improperly handled by infected people or carriers (often workers in restaurants or food processing facilities);
- eating vegetables and fruits contaminated by irrigation with polluted water or fertilized with untreated sewage or sewage sludge;
- eating meat or drinking milk from animals that grazed on contaminated pasture or drank contaminated water;
- eating fish or shellfish grown, caught, or harvested in contaminated water; and
- eating food exposed to flies or vermin that feed on or come into contact with sewage.

Diseases contracted by drinking contaminated water or eating contaminated food are often referred to as waterborne and foodborne diseases.

What Diseases Are Commonly Caused By Wastewater?

Bacteria, viruses, and parasites (including worms and protozoans), are the types of pathogens in wastewater that are hazardous to humans. Fungi that can cause skin, eye, and respiratory infections also grow in sewage and sewage sludge. Scientists believe there may be hundreds of disease-causing organisms present in sewage and wastewater that have yet to be identified.

Diseases Caused by Bacteria

Bacteria are microscopic organisms that are responsible for several wastewater-related diseases, including typhoid, paratyphoid, bacillary dysentery, gastroenteritis, and cholera.

Many of these illnesses have similar symptoms, which vary in severity. Most infect the stomach and intestinal tract and can cause symptoms like headache, diarrhea (sometimes with blood), abdominal cramps, fever, nausea, and vomiting. Depending on the bacteria involved, symptoms can begin hours to several days after ingestion.

Often, infected people will experience only mild symptoms or no symptoms at all. However, anyone experiencing frequent diarrhea and vomiting should seek medical attention immediately. Severe dehydration and death can result with serious cases, sometimes within a day.

Typhoid

Early in this century, typhoid fever was a major cause of death from outbreaks of waterborne disease in this country. Today, water and wastewater treatment has almost eliminated this highly infectious disease in developed countries, but it continues to be a problem in many areas of the world.

Typhoid symptoms often include fever, constipation, 10ss of appetite, nausea, diarrhea, vomiting, and abdominal rash.

In January 1996, an outbreak of typhoid fever was reported in Ain Taya, Algeria, with 910 suspected cases. The cause was traced to sewage contaminating the water reservoirs after a sewage pipe had been darnaged during construction work.

Cholera

Cholera is another waterborne bacterial disease that used to be responsible for recurring outbreaks in the U.S. It is again a threat in much of the world.

'Cholera spreads quickly, especially in areas where people live in crowded conditions without toilets or clean water. Outbreaks also result from people eating contaminated seafood.

Since 1961, there has been a devastating global epidemic of cholera, which spread to this part of the world in 1991. A Chinese freighter that dumped its wastewater into the harbor at Lima, Peru, is suspected of having brought the disease to Latin America for the first time in more than 100 years. The epidemic quickly spread to Ecuador, Colombia, Chile, and north to Mexico. At least 10,000 deaths and 1 million cases have been reported to the Pan American Health Organization from Latin America alone.

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Because cholera can be controlled with water treatment and boil-water advisories, a massive outbreak is unlikely in the U.S. However, smaller, isolated outbreaks have occurred.

Oyster beds contaminated with cholera bacteria were found in Mobile, Alabama, in 1991 and were closed by health officials. Other small outbreaks in the U.S. originated from travelers eating contaminated seafood or seafood brought home in suitcases.

Diseases Caused By Viruses

W-uses are microscopic parasitic organisms. They are smaller than bacteria and can be seen only with an electron microscope. Some can infect people through wastewater.

Viruses can't multiply outside their hosts, and wastewater is a hostile environment for them. But enough viruses can survive in water to make people sick.

Hepatitis A, polio, and viral gastroenteritis are a few of the diseases that can be contracted from viruses in wastewater. Viral gastroenteritis is thought to be one of the leading causes of illness in the U.S.

There may be as many as 100 different virus types present in raw sewage, but they are difficult to identify. Much is still not known about the viruses and other pathogens in wastewater or their exact behavior and effect on humans.

According to the U.S. Environmental Protection Agency, tests using DNA to help detect and identify viruses are being developed.

Parasites in Wastewater

Until recently, most Americans haven't been concerned about parasites in their drinking water. But in the past few years, well-publicized outbreaks of giardiasis (caused by the protozoan *Giardia lambia*), and cryptosporidiosis (caused by the protozoan *Cryptosporidium*) have brought attention to these organisms.

The types of parasites found in wastewater include protozoans and helminths (parasitic worms).

When people drink water contaminated with protozoans, they can multiply inside the body and cause mild to severe diarrhea.

Another protozoan, *Entameoba histolytica*, is the cause of amebiosis, also known as amebic dysentery. Amebiosis used to be a major cause of illness in the U.S. before the days of widespread water and wastewater treatment. Bloody diarrhea is a major symptom.

Infected people become carriers of Protozoans and shed them in feces. The protozoans can form a protective covering called cysts) and become inactive when in hostile environments, like water and wastewater. In this stage, they are often resistant to disinfection and water treatment methods.

While outbreaks can be controlled by boiling water, the best strategy is to prevent pollution by limiting the amount of untreated wastes released to water sources.

Parasitic worms can also dwell in untreated sewage. Tapeworms and roundworms are the most common types found in the U.S. Their eggs are found in untreated wastewater and can be ingested.

Hookworms are still present in the southeastern U.S. They usually enter through the skin or bare feet.

Symptoms from parasitic worms vary, but can include abdominal pain, weight loss, anemia, and fatigue.

HIV *Not* a Threat in Wastewater

Because HIV (Human Immunodeficiency Virus) the virus that causes AIDS (Aquired Immune Deficiency Syndrome) is transmitted through blood and body secretions and is not a waterborne disease, it is not among the risks associated with wastewater.

Although HIV organisms have survived several hours in wastewater in controlled laboratory tests, in reality, wastewater is a hostile environment for HIV. Also, HIV is not shed in the feces like most other pathogens in wastewater, and it cannot multiply outside the human body.

In fact, the only ways that HIV can enter wastewater is through blood, semen, saliva, or tears, and it can only infect people through direct contact with their blood. For these reasons, it is not likely to be present in high enough concentrations in wastewater to pose a risk.

Who is most at risk?

Whether or not someone will get sick after being exposed to untreated wastewater is hard to predict. There are enough disease-causing organisms in wastewater, however, to make contact with it always very risky.

Many people who are infected with pathogens or pollutants in water never even develop symptoms. How healthy you are to begin with, whether or not you have built up a resistance to a specific disease, how the organism or substance enters your body, how potent or toxic it is, and the size of the dose all contribute to how severely you will be affected.

People who have suppressed immune systems because of HIV/AIDS, chronic disease, chemotherapy, or other conditions are especially at risk from wastewater-related diseases. Children, the elderly, and the urban and rural poor are also significantly more at risk than the general population.

Other Wastewater-related Health Concerns

Because of inadequate wastewater treatment, excessive amounts of the nutrients nitrogen and phosphorus sometimes invade water sources causing algae blooms.

Algae blooms are dangerous to fish because they use a lot of the oxygen in the water. They can also have a strong, objectionable smell and can affect the taste of water.

Too much nitrogen in water can also be dangerous for humans. It is the cause of methemoglobinemia, or blue baby syndrome—a condition that prevents the normal uptake of oxygen in the blood of young babies. It is also suspected of causing miscarriages.

Excess nutrients in coastal waters may also be related to certain "red tides," which kill fish and other aquatic life and can cause shellfish poisonings and certain respiratory illnesses in humans.

Metals, such as cadmium, copper, lead, nickel, and zinc, can also be found in wastewater. Some of these metals are needed in trace amounts by our bodies, but can be harmful in larger doses. Acute poisoning from heavy metals in water is rare in the U. S., but whether ingesting small amounts over an extended period of time has any accumulative effects is unknown.

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other potentially toxic substances can enter wastewater from various sources, such as local business, industry, or storm water runoff. These substances can include pesticides and chemicals like chlorinated hydrocarbons, phenol, PCBs (polychlorinated biphenyls), and benzene.

Preventing potentially harmful substances from polluting water in the first place is always the best strategy for protecting health and the environment and preserving valuable water resources for community use and recreation.

Communities can help through programs that ensure local businesses and industries properly pretreat and dispose of the wastewater they generate. Communities can also educate and encourage homeowners to properly dispose of hazardous household chemicals, such as paints, varnishes, photographic solutions, pesticides, and motor oil. Some communities set up special dates and locations for collecting these substances.

How Wastewater Treatment Helps Prevent Disease

Wastewater treatment consists of a combination of processes used in steps to remove, kill, or "inactivate" a large portion of the pollutants and disease-causing organisms in wastewater.

Most treatment methods include a preliminary step in which the solid materials are filtered out or allowed to settle and separate from the rest of the wastewater. Helpful bacteria grow naturally in the solids or "sludge," which provide some initial treatment for the sludge and the wastewater that comes in contact with it.

The wastewater receives further treatment often through a combination of filtration and biological and chemical processes. Liquids are often stored for a period of time to allow further settling and bacterial treatment.

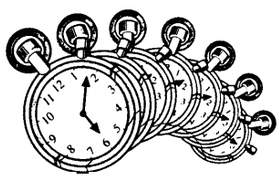
The sludge is then treated further by applying lime or chemicals, air drying, heat drying, or comporting. For final disposal, it is burned, buried in landfills, used as commercial fertilizer, spread on forested land, or disposed of in the ocean.

Soil can also be used to help treat wastewater. If conditions are right, liquid wastes can be applied to soil, and most of the pollutants are either removed, inactivated by bacteria, adhere to certain materials in the soil, or filtered out before reaching the groundwater. Sand or other media can be used in place of soil in areas where the natural soil or geographical conditions are not suited for this purpose.

Disinfection is normally the final treatment step for wastewater being discharged near or directly into surface water or for groundwater recharge. Chlorine, ozone, ultraviolet light, or other chemical agents inactivate many pathogens that manage to survive previous treatment processes.

However, while wastewater treatment is essential for protecting water quality, it is only one barrier against disease. Additional treatment is usually needed to ensure that water is safe to drink.

Wastewater and Disease
some historical notes



1700BC Ahead of **his time by a few thousand years, King Mines of Crete had running water in** his bathrooms in his palace **at Knossos. Although there is evidence of plumbing and sewerage systems at several ancient sites, including the cloaca maxima (or great sewer) of ancient Rome, their use did** not become widespread until modern **times.**

1817 A major epidemic of cholera hit Calcutta, India, after a national festival. There" is no record of exactly how many people were affected, but there were 10,000 fatalities among British troops there alone. The epidemic then spread to other countries and to the U.S. and Canada **in 1832. The governor of New York quarantined the Canadian border in a vain attempt** to stop the epidemic. When cholera reached New **York City, people were so frightened they either fled or stayed inside, leaving city streets** deserted.

1854 A London physician, **Dr. John Snow, demonstrated that cholera deaths in an area of the city could all be traced to a common public drinking water pump that was contaminated with** sewage from a nearby **house. Although he couldn't identify** the exact cause, he did **convince authorities to close the pump.**

1859 The British parliament was suspended during the summer because of **the stench coming from the Thames. As was the** case in many cities at **this time, storm sewers carried a** combination of SeWage, street debris and other wastes, and storm water to the nearest **body of water. According to one account, the river began to 'seethe and ferment under a burning sun.'**

1892 The comma-shaped bacteria that causes cholera was identified **by German** scientist **Robert Koch** during an epidemic **in Hamburg. His discovery proved** the relationship between contaminated water and the disease.

1939 Sixty people **died in an outbreak of typhoid fever at Manten-o "State Hospital in Illinois. The cause was traced to a sewer line passing too close to the hospital's water supply.**

1940 A valve accidentally opened caused polluted water from the Genessee River to be pumped into the Rochester, New York, public water supply system. Approximately 35,000 cases of gastroenteritis and six cases of typhoid fever were reported.

1955 Water containing a large amount of sewage was blamed for overwhelming a water treatment plant and causing an epidemic of hepatitis in Delhi, India. An estimated 1 million people were infected.

1961 A worldwide epidemic of cholera began in Indonesia and spread to eastern Asia and India by 1964; Russia, Iran, and Iraq by 1966; Africa by 1970; and Latin America by 1991.

1968 A **four-year epidemic of dysentery began in Central America resulting in** more than 500,000 cases and at least 20,000 deaths. Epidemic dysentery is currently a problem **in many African nations.**

1993 An outbreak of cryptosporidiosis in Milwaukee, Wisconsin, claimed 104 lives and infected more than 400,000 people, making it the largest recorded outbreak of waterborne disease in the U.S.

Sources: Plumbing and Mechanical Magazine; Environmental Engineering and Sanitation, 4th cd., by J. Salvato; and Water and Wastewater Engineering, vol. 1, by Fair, Geyer, and Okun.

Is Your Community Safe?

Americans often don't realize that ultimate responsibility for protecting their communities from wastewater-related illnesses lies with local governments and community residents. Even though state and federal laws set minimum environmental and health standards, it is usually up to local officials and individual homeowners to ensure that these standards are being met on a regular basis.

Community Treatment Systems

Small communities that rely on centralized water and wastewater treatment plants need to make sure that these facilities are being properly operated and maintained. Local governments must make it a priority to monitor treatment plants, be aware of any deficiencies, and ensure that needed improvements are made. Money must somehow be made available for this purpose.

Monitoring may also be done by health departments or state departments of natural resources, environmental protection, or other government agencies. But compliance at inspection time does not guarantee consistent treatment-it is up to communities to protect the health of their residents by making certain that water and wastewater treatment plants stay in compliance.

Another concern for many communities is aging infrastructure and treatment facilities that need to be repaired, replaced, or upgraded. Old sewers and drinking water lines with cracks or leaks in them can be an additional source of pollution and drinking water contamination.

Some older communities that use the same pipes for sewers and street storm water drains may have problems with flooding and overflows when it rains or when snow melts. Often, untreated wastewater is dumped into nearby lakes, rivers, or oceans. Communities may eventually need to separate the lines and the combined sewer overflows (CSOs) and other sewer overflows need to be monitored and controlled. *(For more information about CSOS, see the Spring 1995 issue of Pipeline.)*

Onsite Wastewater Systems

Many households in small and rural communities use individual onsite treatment systems, such as septic systems. These also need to be monitored and maintained. Onsite systems that are improperly sited, constructed, operated, or maintained can fail and failing systems cause a number of environmental and health problems.

Failing onsite systems can cause untreated sewage to pond on the surface of the ground, where it can pose a risk to neighborhood children and animals and provide a breeding place for flies, mosquitoes, and other disease carriers. Groundwater can be polluted by failing onsite wastewater systems, which can contaminate nearby water sources and wells.

According to a recent NSFC questionnaire to which 43 percent of the nation's local health departments responded, there are more than 11 million onsite systems in the U. S., and in 1993 alone, at least 87,610 of these were listed as failed and 92.402 needed to be repaired or replaced. Unless homeowners and communities take steps to ensure that onsite systems function properly, every system represents a potential health risk for the community.

It is also extremely important for homeowners to have their well water tested. Outbreaks of waterborne illnesses are frequently traced to contaminated well water. Even well water that looks and tastes fine may contain harmful microorganisms and contaminants from chemical spills, fertilizers, pesticides, and failing wastewater treatment systems. A qualified laboratory can test well water for both bacteria and chemicals.

One way that communities have been working to help ensure that the health of the public is protected is by forming management programs for onsite wastewater treatment systems. The idea behind these programs is to help homeowners by centrally monitoring and managing onsite systems to make sure they always function correctly and that the health of the community is never at risk. These programs can vary in scope and be organized to fit the needs of individual communities. *(For more information about management programs for onsite systems, refer to the Spring 1996 issue of* Pipeline.)

Community Awareness Is Needed

The potential for outbreaks of wastewater-related illnesses in many small communities across the U.S. is significant, and to protect public health, water and wastewater treatment projects need to be given priority and community leaders and residents need to be aware of potential problems.

Rural homeowners need to learn about what is good and bad for their onsite systems, what maintenance is needed, and how to identify possible problems. Homeowners with wells need to be informed about well water testing and preventing contamination.

Communities also need to regularly monitor local water quality. Sometimes illegally dumped wastes can threaten water and groundwater resources. Strategies are needed for identifying and solving local pollution problems, and residents, businesses, and industry need to be educated about the health dangers associated with untreated wastewater.

To order the issues of Pipeline *about CSOS or onsite wastewater treatment management programs, or for more information about the health department questionnaire cited in this article, contact the National Small Flows Clearinghouse at (800) 624-8301. &*

Pollution Self-Assessment Programs Available

If you are **a farmer or homeowner** in a rural community and want to know how you can do your part to protect your health and the environment, Farm*A*Syst/Home*A* Syst offers easy-to-use self-assessment programs.

Both programs are intended to help farmers and rural residents identify and evaluate pollution risks on their property and develop a plan of action to reduce those risks.

Homeowners with septic systems and/or wells should find the Home* A*Syst program particularly helpful.

FARM•A•SYST
Farmstead Assessment System

*For more information about the programs, write Farm *A*Syst/Home*A*Syst National Program, B142 Steenbock Library, 550 Babcock Drive, Madison, WI, 53706-1293, or call (608) 262-0024, fax (608) 265-2775, or e-mail farmasyst@macc. wise. edu.*

El Paso's Colonias Make Progress

Scattered along the Texas/Mexico border are settlements known as colonias, where, because of inadequate water and wastewater facilities, people face the constant danger of contracting wastewater- and environmentally-related diseases.

Public health conditions in the colonias in both the U.S. and Mexico have been regarded for years as potentially disastrous. But thanks to recent changes in local regulations and the work of concerned citizen groups and health officials, the plight of the El Paso, Texas, colonias is beginning to improve.

Colonias originated in the 1960s when developers found they could buy cheap land outside the jurisdiction of towns and cities, divide it into small plots, and sell them to low-income families.

Before 1988, there were no laws requiring developers to provide utilities, paved roads, or even water or wastewater facilities in these areas.

Residents were able to buy land with small down payments and often bought trailers or put up small shacks. In colonias, shallow wells dug too close to makeshift privies are the norm. Sewage is often just dumped into open holes or ditches.

Despite these conditions, colonias continue to attract poor and low-income residents from neighboring cities and Mexico. Many view the colonias as an escape from the overcrowding, crime, and other problems of the cities.

According to Roberto Gonzales, manager of El Paso County's On-site Sewage Disposal Facility Program, there are about 150 such colonias in the El Paso area with more than 73,000 residents.

"Frequently, Third World conditions will exist," says Gonzales, "and health problems include the classic diseases you get with fecal contamination of the water supply."

When a group of local school children was tested, 95 of561 were positive for hepatitis A, meaning they had been exposed at sometime in their lives. Hepatitis A is a highly contagious disease that frequently spreads through contact with feces or contaminated water.

According to Gonzales, it is difficult to know the full impact of these illnesses because most are never reported. "If 50 people were to get sick, I bet only about two would report it. Going to the doctor is not part of the local culture. Most stomach ailments are treated with traditional home remedies."

Adding to the health and environmental problems in the area are what are known locally as the black waters, or aguas negras, which include untreated sewage from the neighboring city of Juarez, Mexico. The sewage is discharged to canals, some of which may leak into the Rio Grande.

However, in the past few years, conditions have been improving in the colonias, and Gonzales is hopeful for his program (which monitors the county's small onsite wastewater treatment systems), and that local progress will continue.

Funding has been provided by the U.S. Environmental Protection Agency, the Texas Water Development Board, and the Texas Natural Resource and Conservation Commission. In addition, Texas passed House Bill 1001 in July 1995 prohibiting developers from selling lots without water or proper sewage disposal.

"A lot of the credit for this belongs to the local, grassroots organizations, like EPISO [El Paso Interreligious Sponsoring Organization], who brought attention to the problem," Gonzales says. 'They got the voters and the politicians to take notice."

Approximately $72 million has been earmarked to construct public sewer and water systems. In addition, many residents living on the outskirts can qualify for grants or low-interest loans to finance onsite wastewater treatment.

In each of the past five years, Gonzales' program has processed and approved an average of 1,200 applications for onsite wastewater treatment systems.

"That leaves an estimated 3,000 to 7,000 dwellings that may not have adequate systems," he says.

According to Gonzales, onsite systems in the El Paso area cost anywhere from $1,700 to $3,000, which are about the lowest rates in the state. But for many in the colonias, these prices represent a small fortune.

"You must realize that El Paso is the fourth poorest city in the nation per capita and the fourth largest city in Texas," explains Gonzales. "So a lot of help is needed."

Afterall, progress for the colonias means progress for the whole area. Because of the variety of ways that waterborne diseases can spread, there is always the possibility that residents who farm or work in restaurants, hotels, or hospitals, for example, may contribute to a more widespread outbreak. With the threat of contagious diseases like hepatitis, and cholera and the possibility of outbreaks and epidemics, there is really no such thing as a "local" health problem.

Contacts

Local Health Departments

Small community residents with water- and wastewater-related health questions should contact their local health depart-merit. Health departments can also help residents identify appropriate wastewater treatment options and water testing facilities for their area. (Health departments are usually listed in the government section of local phone directories.)

Extension Service Offices

Many universities have U.S. Department of Agriculture extension service offices on campus and field offices in other localities. Extension service offices can help provide assistance and information about many of the wastewater treatment issues discussed in this newsletter. To locate the extension office in your area, call the U.S. Department of Agriculture at (202) 720-3377, or the NSFC at the number below.

National Small flows Clearinghouse (NSFC)

The National Small Flows Clearinghouse (NSFC), located at West Virginia University, provides small communities and homeowners with information and technical assistance on wastewater issues. Funded by the U.S. Environmental Protection Agency, the NSFC also offers a variety of free and low-cost informational products, some of which are listed in this issue. Contact the NSFC at (800) 624-8301 for more information or for a free products catalog.

RESOURCES AVAILABLE FROM NSFC

To order any of the following products, call the National Small Flows Clearinghouse (NSFC) at (800) 624-8301, or write to NSFC, West Virginia University, ?? O. Box 6064, Morgantown, WV 26506-6064. Be sure to request each item by title and item number. A shipping and handling charge will apply.

Manufacturers and Consultants Database Search

This National Small Flows Clearinghouse database can provide callers with a list of industry contacts for wastewater products and professional consulting. The database can serve as a resource for private citizens, engineers, health professionals, and local officials. The price is 15 cents per page. Request Item #WWPCCM 16. Please also specify the topic of the search.

Free Report: The Benefits of Water and Wastewater Infrastructure

This 14-page report, available free from the National Small Flows Clearinghouse and the National Drinking Water Clearinghouse, explains the need for water and wastewater infrastructure funding and the benefits of clean water to public health, the environment, economic development, standard of living, and the development of new technologies. Nearly 40 references are cited. Request Item #WWBLPE07.

Free Poster: Water Quality . . . Potential Sources of Pollution

Water quality is the theme of this colorful poster. It defines point source and nonpoint source pollution and depicts the potential sources of water pollution. Experiments are outlined for children to gain a better understanding of erosion, surface water pollution, and groundwater pollution that occurs daily throughout the nation. Request Item #WWBLPE27.

The following videos for children are available on loan from the NSFC:

Ground Water Video Adventure

Dino Sorrus guides children through a video game adventure to explore the world of fresh water below the earth's surface. The children learn that protecting groundwater from industry, agriculture, and other human activities is a difficult task, but one that we can all help achieve. Request Item #WWVTPE23.

Saving Water: The Conservation Video

In this informative children's video, a dinosaur takes a young boy on an adventure to a museum of the future where the last remaining drops of clean water on earth are displayed. The video discusses easy ways to conserve water and how pollution and waste threaten our future water supply. Request Item #WWVTPE24.

Surface Water Video

This video explores the world of streams, lakes, oceans, and rivers with the help of a dinosaur. The earth's water recycling process, pollution sources, and water conservation are also discussed. Request Item #WWVTPE22.

PIPELINE

Pipeline is published quarterly by the National Small Flows Clearinghouse at West Virginia University, P.O. Box 6064, Morgantown, WV 26506-6064.

Pipeline is sponsored by
U.S. Environmental Protection Agency
Washington, D.C.
Steve Hogye—*Project Officer*
Municipal Support Division
Office of Wastewater Management

National Small flows Clearinghouse
West Virginia University
Morgantown, WV
Peter Casey–*Program Coordinator and Special Technical Advisor*
Jill Ross-*Publications Supervisor*
Cathleen Falvey—*Editor*
Daniel Gloyd—*Graphic Designer*

ISSN: 1060-0043

Pipeline is funded by the United States Environmental Protection Agency The contents of this newsletter do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.

Printed on recycled paper.

For Wastewater Information, Call the NSFC at 1-800-624-8301.

National Small Flows Clearinghouse
West Virginia University
P.O. Box 6064
Morgantown, WV 26506-6064
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Keith Warzecha 58613
SCIENCE APPLICATIONS INTN'L CORP
C/O Barlay Inge
11251 Roger Bacon Dr
Reston VA 20190-5201